STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY

INTER-OFFICE CORRESPONDENCE

DATE: April 25-May 2, 1975

MEMO TO: Division of Water Pollution Control - Field Operations Section

FROM: G. T. Bachman, EPE, Region III-C, DWPC/FOS GTB

SUBJECT: DOUGLAS COUNTY (Tuscola) - Cabot Corporation
Wastewater Disposal During Deep Well Failure

The processing of wastewater during the recent period of time Cabot's deep well was out of operation is summarized below:

Friday, April 25: Mr. Jack Roaper, Chief Engineer, telephoned the writer. He reported routine turn-around maintenance on the deep well system had been performed April 21-23 after which efforts to place the well back into operation had been unsuccessful as it would not take fluid. Subsequent pulling revealed five joints of piping were still down the well. It would be necessary to try "to fish" these out and if this was unsuccessful the well would have to be drilled or reamed out. The situation had been discussed with Ward Akers of Variance and Technical Analyses. It appeared it would be three to four days at best before the well would be back in service. In the meantime, the level in the settling ponds preceding the deep well was becoming critical and Roaper proposed to neutralize this water in their mix tank with subsequent discharge to waters of the State. A tanker of caustic was available to accomplish the neutralization.

A similar incident had occurred in April of 1973 and erratic neutralization had been accomplished using caustic in one of the junction boxes carrying the wastewater off their property. Resultant violations included excess chlorides, excess total dissolved solids, settleable solids, unnatural turbidity and bottom deposits downstream. A referral was submitted at that time but was later dropped. Roaper was reminded of the previous incident and a discussion on alternatives to what he was considering led to the following possibilities: (1) Tanking the wastewater to the Industrial Water Supply storage lagoons less than a mile away which are used to store concentrated waste from USI and then bleeding it slowly into their waste treatment facilities if they would agree to it. (2) Batch neutralization in the deep well pre-mixing tank with subsequent decanting of supernatant after settling to remove as many solids as possible. (3) Construction of a temporary storage lagoon to hold the wastewater until the deep well was back in service.

You are therefore requested to provide this Agency with a written response within thirty (30) days of the receipt of this letter indicating:

(1) the steps which you are taking to prevent further discharges of this nature, including specific deadline for the accomplishment of such steps, and

(2) proof of the contribution of $115.47, the value of the fish killed in this incident, to the Game and Fish Fund of the State Treasury.

In addition, subsequent visits on or about September 16 and 25, 1975, revealed poor quality discharges had again occurred as a result of the failure of key pumps allowing pits with contaminated water to overflow to your plant drainage system. Provision of adequate backup and/or alarm systems to prevent the bypassing of your waste disposal system should be provided.

Your failure to adequately respond to this letter will result in referral of this matter to the Enforcement Section of the Division of Water Pollution Control for appropriate action.

If you should have any questions regarding the above, please contact the undersigned at 4500 South Sixth Street, Springfield, Illinois 62706; telephone: (217) 786-6892.

Very truly yours,

ENVIRONMENTAL PROTECTION AGENCY

John J. Forneris

John J. Forneris
Manager, Region III
Division of Water Pollution Control

GTB:bh

cc: - DWPC/FOS
- DWPC/FOS-Region III-C

The third alternative appeared to be the simplest and most feasible approach and after further discussion Roaper indicated one of their diked tank farm areas might possibly be a temporary storage area. After checking on this, he telephoned again and reported that the wastewater could be neutralized in the mix tank, transferred to the diked area for settling, and then discharged to the receiving stream. The usable diked area he estimated was about 50' x 100' x 2-3' deep providing about 75-110,000 gallons of storage capacity. Emergency operational procedures were being used in the production processes thereby minimizing wastewater flows to around 50 gpm. This would give them one to two days storage in the diked area before a discharge would be necessary.

It was agreed that two hours prior to the anticipated time of discharge, Roaper would contact Region III-C personnel to allow time for us to be present for the initial discharge and to monitor its subsequent effect.

Saturday, April 26: Roaper contacted the writer and indicated that they had started transferring to the diked area at seven o'clock that morning. Some sedimentation was occurring and it appeared it would be at least another day before a discharge would be necessary.

Sunday, April 27: Roaper contacted K.L. Baumann. Depth had risen to approximately one foot in the diked area. Still no need to discharge.

Monday, April 28: Plant Manager Mike Fowler and Roaper both called during the day. Ward Akers and John Leemon were there during the morning. "Fishing" efforts had thus far been unsuccessful. Roaper indicated the level in the diked area continued to rise slowly. He noted maintaining the pH in the 6.0 to 9.0 range was difficult, good sedimentation was taking place, and the upper 9-12" of water was relatively clear. We both agreed that seepage into the ground might be accounting for the lower rate of filling than we had anticipated. However, the effects of any contamination would show up at their property line junction box where area sub-surface drainage tiles combine with their normal permitted process water discharge from the Nash seal pumps and the domestic wastewater treatment facility. As yet, they had noted no increase in total dissolved solids or chlorides.

Tuesday, April 29: The writer visited Cabot to observe the situation. Jack Roaper and George Schenck were interviewed. Roaper reported that "fishing" efforst had been terminated and that they were ready to begin drilling out the well. He felt that they could be back in operation by late Wednesday or early Thursday.

Mr. Schenck, Production Engineer, was in charge of the neutralization being performed and accompanied the writer to the site where the attached pictures were taken. The diked area storage depth ranged from 4-5 ft. of depth at the east end to 12-18 in. at the west end. Installation of a

temporary berm across the west end would allow an additional 2 ft. of storage if necessary. At the time of the visit, 7,000 gallons of 50% caustic had thus far been used with erratic results. An air sparger and a recirculation pump had been installed in hopes of providing better equalization in the diked area. Schenck was optimistic that no discharge would be necessary and that the stored wastewater could be returned to the deep well once it was back in operation.

A sampling survey summarized below was performed to verify that no contaminants were leaving Cabot's property.

Station	pH	TS/EC	Cl	TSS
Junction box entering field tile system	7.4	1055*	390	21
Outlet of field tile system	7.5	530	95	4
Road bridge between Rt. 45 and I-57	7.9	490	88	25

* ROE

These results give no indication that material was or had been escaping from the diked area.

Thursday, May 1: Roaper telephoned to indicate the well testing was complete and tubing was being placed back in the well with operation scheduled to begin the morning of May 2. Still no discharge necessary.

Friday, May 2: Fowler telephoned to report the deep well was back in service and the stored wastewater would be fed slowly back into the system.

Throughout the course of this failure, the need for a backup well or an emergency storage lagoon was stressed. Cabot indicated that for some time they had been working toward a second well with our Agency. Subsequently on May 5, Permit #1975-EA-497 for drilling of a test hole was issued. Hopefully, this will eliminate the discharge problems caused by the failure of the existing deep well in April of 1973 and again in April of 1975.

Routine surveillance will continue.

GTB:bh
cc: - K.L. Baumann, Region III-C
- Ward Akers, Variance and Technical Analyses

DOCUMENT "A"

REPORT ON SURVEILLANCE

OF

DEEP WELL UPSET AND SUBSEQUENT ACID DISCHARGE AT CABOT CORPORATION

Tuscola, Illinois

April 10, 1973 to April 17, 1973

April 10, 1973

3:30 p.m.: Dr. William Tambo, Plant Manager, Cabot Corporation's Tuscola Plant, calls the writer to inform that they believe damage has occurred to the tubing in their acid disposal deep well. A drop in the annulus pressure had been detected at 3:00 a.m. on April 9. To continue using the well might result in permanent damage to the casing. Therefore, they had decided to pull the tubing for inspection. "Turn around time" for this operation is 5-10 days barring any severe complications. During this period the acid waste normally disposed of in the well after passing through a settling pond will overflow from the pond to waters of the State. When scheduled maintenance is performed, the pond levels are lowered in advance to provide storage during the "turn around". However, this problem was not scheduled. The overflow began occurring late on April 9 and a pH check by Cabot personnel showed a pH of 2.0 at their property line where flow enters the field tile system of Drainage District #4, Tuscola Township. The ~~tiel~~ tile system opens approximately two miles southeast of the plant to form an unnamed branch of the Scattering Fork. Normally, Cabot contributes 40 gpm of Nash

pump seal water and some surface runoff (access road, parking lots and roof) to this tile system. However, with the deep well our to operation, an additional 50-70 gpm of highly acidic wastewater was being discharged. Dr. Tambo indicated the rigging crew would be in early on April 11 to begin pulling the tubing. The writer suggested that emergency measures be taken to provide neutralization by using limestone, soda ash, or caustic. It was also pointed out that Cabot would be responsible for any resultant violations of the EPAct and Water Pollution Regulations of Illinois.

4:30 p.m.: Sanitary Inspector John Bell departs to collect samples and check field pH's to determine severity of problem.

4:45 p.m.: Dr. Tambo calls again. Fine limestone (one inch pea gravel) has been ordered to place near the end of the pond in a berm formation so that all acidic water must filter through it. Also negotiating to obtain sodium carbonate or caustic for additional pH adjustment. Sample collected at property line (B-1) had 5200 ppm chlorides and a pH of 1.3; and, at the outlet of the field tile system (C-1) had 950 ppm chlorides and a pH of 2.1.

5:00 p.m.: Attached telegram (p. 9) from J. J. Forneris advises Cabot that discharge may be a violation of the Environmental Protection Act and Water Pollution Regulations of Illinois.

5:15 p.m.: Sanitary Inspector Chuck Hall returns to office and indicates routine effluent sample was collected at 10:00 a.m. that morning. He reported a "white turbid" appearance. Laboratory personnel found the sample to have a pH of 1.1 (See page 21). Hall's presence may explain why Cabot chose to report the incident.

5:00 p.m. - 7:00 p.m.: Sanitary Inspector John Bell conducts stream sampling survey. Sampling stations have been established as shown on the quadrangle map on Page 10 and all sample result summaries and laboratory sheets have been cross-referenced with this map. The results of Bell's survey are summarized on Page 20.

April 11, 1973

10:00 a.m. - 2:00 p.m.: EPE Rich Ryczek and the writer visit Cabot. Dr. Tambo and Mr. Russell Hamm are interviewed. Limestone dikes are nearly complete (Picture #'s 1-3 on Page 11). It had been necessary to open a rock quarry late yesterday to obtain the limestone and a man had worked all night constructing the dikes. Soda ash is also being added at a junction box (Picture #'s 5 & 6) for additional pH adjustment. Hopefully by tomorrow they will be set up to feed 50% liquid caustic to this junction box. The following time table should be feasible provided no major problems are encountered:

All tubing pulled by April 12th.
All tubing tested by April 13th.
Casing logged on April 14th.
Tubing replaced on April 15th.
Back in operation on April 16th.

Spare tubing is on hand should the testing reveal any faulty sections in need of being replaced.

Dr. Tambo indicated a similar failure had occurred last summer but the ponds were low enough to provide sufficient storage and no overflow occurred. Therefore, they did not report it. It should be noted that the ponds in addition to receiving normal wastewater also receive contaminated surface and subsurface drainage. Had it not been for the unusually wet spring, sufficient storage might have been available during this failure.

The well is normally pulled and inspected every six months according to Tambo.

Before leaving, the neutralization activities were observed and a sample of the discharge at the property line was collected. (See Picture #'s 7-8) The discharge had a white milky color and was obviously high in suspended solids. Utilizing pH paper, the field pH at this point was determined to be approximately 7.0. Dr. Tambo hoped that the suspended solids would be reduced somewhat when they began using the liquid caustic.

The oil was being pumped from the outer annulus and the rigging crew was about ready to begin pulling the mile deep tubing.

After leaving the plant, a stream sampling survey was conducted at the stations originally established. A summary of the results of that survey and of comments and observations is presented on Page 27 . The effects on the receiving stream are shown in Picture #'s 9 and 10 on Page 13 .

April 12, 1973

9:15 a.m.: Russ Hamm calls to report that the tubing removal is about 65% complete. Of those sections pulled, two of the couplings have small cracks and are not expected to withstand the pressure test. The testing should take place tomorrow and the logging on Saturday as scheduled. A maintenance man was on duty all night adding 3-5 100# bags of soda ash per hour. Four samples were collected at the property line and pH's in the range of 6.2-7.9 were detected in these samples. A truck load of 50% caustic is expected to arrive around noon. The riggers worked continuously ~~expect~~ except from midnight to 6:00 a.m.

2:00-4:00 p.m.: Writer visits Cabot. Russ Hamm interviewed. All the tubing has now been pulled. Other than the two couplings mentioned earlier, nothing unusual was obviously visible. If the pressure testing reveals nothing else, the original pressure drop could have been caused by a hole in the casing or an obstruction in the formation which broke through.

Almost ready to begin feeding liquid caustic. The tanker has been unloaded in a storage tank and a small 1-inch diameter pipe extended from the storage tank to the junction box. (Picture #14). A maintenance man will remain on duty all night for periodic sampling and to adjust the caustic feed rate based on the sampling results.

A sample was collected at the property line (B-1). The field pH was in the 5.5-6.0 range. The discharge continued to have a tannish-white color and to be high in suspended solids.

A stream sampling survey was again conducted. A summary of the results of that survey and of comments and observations is presented on Page 35 . For the first time, field pH's in the receiving stream were found to be acceptable, but, unnatural bottom deposits were beginning to accumulate. See Picture #'s 15-17 on Page 16 . There were no visible effects after the first tributary mixed in with the main branch of the Scattering Fork at C-5.

April 13, 1973

9:30 a.m.: Russ Hamm calls. Hydrostatic pressure testing has begun. Will take a full working day. Began adding caustic about 6:00 p.m. last night. Samples are being collected every two hours with adjustments in the feed rate being made as needed. If all goes well, they may be back in operation by Monday (April 16). Writer indicates that sludge deposits are beginning to accumulate downstream and that they will be held responsible for these. Might consider construction of an impoundment basin at tile system outlet if permission could be obtained from farmer who owns land. This would provide settling and retention of solids in a limited area with hopefully a better overflow to the receiving stream.

9:00 a.m. - 10:30 a.m.: Sanitary Inspector John Bell conducts sampling survey. A summary is presented on Page 40. Field pH's generally acceptable; but, unnatural color and bottom deposits now extend to Station C-6. See Picture #'s 20-26 on Pages 17-19.

April 16, 1973

9:30 a.m.: Russell Hamm calls. Testing of tubing completed Friday, April 13; casing logged on Saturday; and tubing reinstalled on Sunday. No holes or defects were detected. The uppermost 48 couplings were replaced with new ones as a precautionary method. They are still unable to explain their original loss of pressure. It may have been due to a shift in the geological formation into which they were pumping. Currently pumping oil back into outer annulus and building pressure back up. Still feeding pencil stream of liquid caustic and checking pH at property line every two hours. Eighty percent of the readings have been above 6.0. High suspended solids are still present in the discharge.

9:00 a.m. - 10:30 a.m.: Sanitary Inspector Bell conducts sampling survey (See summary on page 45).

4:45 p.m.: Russell Hamm calls. Waiting for epoxy cement to cure before starting to pump to deep well again. Should be pumping by 6:00 p.m.

April 17, 1973

9:30 a.m.: Russell Hamm calls. Well began taking flow at 5:30 p.m. preceding night. Reached steady conditions at 7:00 p.m. Overflow from ponds was discontinued at approximately 4:30 p.m. and caustic

feed was shut off. Samples collected this morning show pH of 7.0 at property line and 7.3 at the outlet of the tile system. Will call if anything develops but situation is now back to normal.

9:00 a.m. - 10:00 a.m.: Sanitary Inspector Bell conducts sampling survey. Results are summarized on Page 50. All field pH's are acceptable and clear flow is observed. Chemical analyses are typical of what they had been prior to this incident.

SUMMARY

Based on the herein reported investigation, it is concluded that Cabot Corporation discharged contaminated water as a result of "forced" down time of their disposal well from April 10 through April 16, 1973. Adequate evidence appears to exist to allege the following violations of the Environmental Protection Act and the Water Pollution Regulations of Illinois as a result of this pollutional discharge.

Section 12(a) - April 10, 11, 12, 13, and 16

Rule 203(a) - April 10, 11, 12, 13, and 16

Rule 203(b) - April 10, and 11

Rule 203(f) - April 10, 11, 12, 13, and 16 w.r.t. chlorides

Rule 203(f) - April 10, 11, 12, 13, and 16 w.r.t. total dissolved solids

Rule 403 - April 10, 11, 12, 13, and 16

A referral checklist will be initiated.

G T. Bachman

G. T. Bachman, EPE
Wabash Sub-Unit

GTB:bh
5/29/73
cc: - K. L. Baumann, Supervisor
Ohio Basin Unit.
Surveillance Section, WPC